IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.(Currently Amended) A method for supervising an OFDM wireless communication system including a MAC layer and a PHY layer, said PHY layer including a supervisor unit, the method comprising the ~~act~~ acts of:

inputting into the supervisor unit a first set of input data comprising a target bit rate (Target_Rate) and a target bit error rate (Target_BER);

processing by the supervisor unit the first set of input data; ~~and~~

outputting from the supervisor unit a code rate C, a set of codes $M=\{M_i\}$ for specifying constellations for ~~sub-channels,~~ sub-channels; and

outputting actual QoS data to the MAC layer including outputting an actual rate actually determined for a current

transmission and an actual bit error rate (BER) actually determined for the current ~~transmission).~~ transmission.

2.(Currently Amended) The method of claim 1, said PHY layer including the supervisor unit for controlling performance of the PHY layer, wherein the processing is for minimizing transmission power in the wireless communication system and comprises the acts of:

calculating maximum bit rate achievable by every couple M/C, identified by modulation k and code-rate i, with all sub-channels turned on;

eliminating the couples M/C for which a maximum achievable bit rate is less than requested bit rate;

and for every couple useful M/C:

calculating a minimum number of sub-channels required to achieve the bit rate B;

deriving, from simulation-based curves, a signal to noise ratio (SNR) necessary to obtain a required BER and use it to derive the SNR required by a worst sub-channel;

[[e)]] calculating a total received power for all $N^{(k,i)}$ sub-channels;

[[f)]] selecting and outputting a selected couple M/C ($(M,C)_{min\_pow}$) which minimizes $P_{r,\min\_pow} = \min_{(k,i)}\{P_{r,tot}^{(k,i)}\}$.

3.(Currently Amended) The method of claim 2, wherein, in case a starting information is a maximum transmit power and the Target_BER, the processing act further comprises the acts of:

[[a)]] calculating a maximum received power;

[[b)]] calculating a minimum SNR on a weakest sub-channel, for every number j of sub-channels considered and storing the result;

[[c)]] for every couple M/C, calculating a number of sub-channels having an SNR above threshold yielding a BER requested by the MAC layer;

[[d)]] calculating the bit rate achievable using $N^{(k,i)}$ sub-channels;

[[e)]] finding a maximum M/C that yields the maximum bit rat; and

[[f)]] selecting and outputting a maximum couple M/C.

4.(Currently Amended) The method of claim 2, wherein, in case a starting information is a maximum transmit power and the Target_Rate, the processing act further comprises the acts of:

calculating a maximum receive power;

for every M/C, calculating a number of sub-channels used to achieve the bit target rate;

[[c)]] selecting the SNR on the worst sub-channel;

[[d)]] calculated from a BER-SNR curve, the BER corresponding to the worst sub-channel for modulation of k and code-rate i;

[[e)]] finding a minimum couple M/C that yields the minimum value; and

[[f)]] selecting and outputting minimum couple M/C.

5.(Currently Amended) A method for supervising an OFDM wireless communication system including a MAC layer and a PHY layer, said PHY layer including a supervisor unit, the method comprising the ~~act~~ acts of:

inputting into the supervisor unit a first set of input data comprising a target bit rate (Target_Rate) and a target bit error rate (Target_BER);

processing by the supervisor unit the first set of input data; and

outputting from the supervisor unit a code rate C, a set of codes $M=\{M_i\}$ for specifying constellations for sub-channels, an

actual rate actually determined for a current ~~transmission)~~ transmission and an actual bit error rate (BER) actually determined for the current transmission;

wherein the processing act further comprises the acts of:

comparing Target-Rate and Rate_(N)=C_*log(M_)*N for each available N (from 1 to max_available_N);

selecting and accepting values of N satisfying Target_Rate≤Rate_(N);

ordering the values in ascending order to get [N_{min}, N_{max}];

assuming $N_{opt}=N_{min}$; and

providing N_{opt} and minimum TX power parameters as an output.

6.(Currently Amended) The method of claim 5, further comprising the acts of, after assuming $N_{opt}=N_{min}$:

checking if a transmission power constraint is satisfied, if so providing N_{opt} and minimum TX power parameters as output, if not

proceeding to check if another value is available in a set ~~[N_{min}, N_{max}]),~~ [N_{min}, N_{max}], if so, choosing a next (next_N), setting N to next_N and jumping to select and accept the values of N that satisfy Target_Rate≤Rate_(N), if not

setting $N_{opt}=0$ and providing N_{opt} and minimum TX power

parameters as the output.

7.(Previously Presented) The method of claim 6, wherein the processing further comprises the acts of:

selecting a best window position among possible ones:

(max_available N-(N_{opt}-1)); and

running an adopted TX power minimization algorithm on the selected window.

8.(Previously Presented) The method of claim 1, further comprising the acts of:

feeding a second set of input data including channel power transfer functions $H=\{|H_i|^2\}$: (index i refers to the i^{th} sub-carrier) from the PHY layer to the supervisor unit;

processing the first and second set of input data for minimizing processing and transmission power in the OFDM wireless communication system; and

outputting N, modulation, coding parameters and transmission power parameters to the PHY layer.

9.(Previously Presented) The method of claim 8, wherein the

feeding of the first set of input data comprises feeding a Max_Delay (max tolerable delay).

10.(Currently Amended) The method of claim 8, wherein the outputting of coding parameters and transmission power parameters to the PHY layer comprises:

N: IFFT/FFT length;

the C: Code rate data;

B: Block length data;

n: data as to the number of decoding iterations;

the $M=\{M_i\}$: data as to a set of codes to specify different constellations adopted for different sub-channels ~~(e.g.~~, wherein $M_i=0$ means that the i^{th} sub-channel is OFF~~, different values specify constellation types in the pre-defined available set)~~;

and $P=\{P_i\}$: data as to a set of different transmission powers adopted for the different sub-channels, wherein $P_i=0$ means that the i^{th} sub-channel is in an OFF state.

Claims 11-12 (Canceled)

13.(Currently Amended) ~~A method for supervising an OFDM~~

~~wireless communication system including a MAC layer and a PHY layer, said PHY layer including a supervisor unit, the method comprising the act of:~~

~~inputting into the supervisor unit a first set of input data comprising a target bit rate (Target_Rate) and a target bit error rate (Target_BER);~~

~~processing by the supervisor unit the first set of input data;~~ and

~~outputting from the supervisor unit a code rate C, a set of codes $M=\{M_i\}$ for specifying constellations for sub-channels, an actual rate actually determined for a current transmission) and an actual bit error rate (BER) actually determined for the current transmission;~~

~~wherein~~ The method of claim 1, wherein the MAC layer requests a feedback specifying a Feedback_mode, where one bit information is used to specify if MAC is interested to have feedback information on a current maximum available rate or a minimum available BER, and specifying a Service_mode, where one bit data is used to specify if MAC QoS requirements refers to a Rate guaranteed service or to a BER guaranteed service.

14.(Previously Presented) The method of claim 11, wherein the outputting act further comprises the act of outputting:

a MAC_return comprising a Max_available_Rate (maximum available rate for a current channel condition as far as BER and tolerable delay requirements are concerned); or

a Min_available_BER (minimum available BER for the current channel condition as far as rate and tolerable delay requirements are concerned) after the processing act.

15.(Previously Presented) The method of claim 1, wherein the processing act is for minimizing processing and transmission power in a wireless communication network system and further comprises the act of finding N, the M/C couple and ON sub-channels required to fit the Target_Rate and the Target_BER requirements with a minimum power, given a current channel condition.

16.(Previously Presented) The method of claim 15, wherein, in case channel conditions prevent achieving a required QoS even with a maximum available transmission power, a supervisor algorithm finds an M/C couple, a number and a position of ON sub-channels required to get

a maximum rate compatible with the Target_BER requirement, given the current channel condition and a maximum power allowed by system specifications, or

a minimum BER compatible with the Target_Rate, given the current channel condition and the maximum power allowed by the system specifications.

17.(Previously Presented) An OFDM wireless communication system including a MAC layer and a PHY layer, said PHY layer including the supervisor unit, wherein the supervisor unit is configured to perform the method of claim 1.

18.(Previously Presented) A supervisor unit in the OFDM wireless communication network system including the MAC layer and the PHY layer including said supervisor unit, wherein the supervisor unit is configured to perform the method of claim 1.

19.(Previously Presented) An interface unit in the OFDM wireless communication system including the MAC layer and the PHY layer, said PHY layer including a supervisor unit, said interface being located between the supervisor unit and the MAC layer,

wherein said interface unit is configured to perform the method of claim 1.

20.(Previously Presented) A computer-readable medium containing a computer-readable program for use in the OFDM wireless communication system including the MAC layer and the PHY layer, said PHY layer including a supervisor unit, wherein the program, when implemented in the supervisor and run in the supervisor unit, causes the supervisor to perform the method of claim 1.